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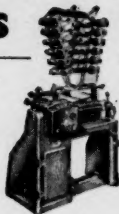
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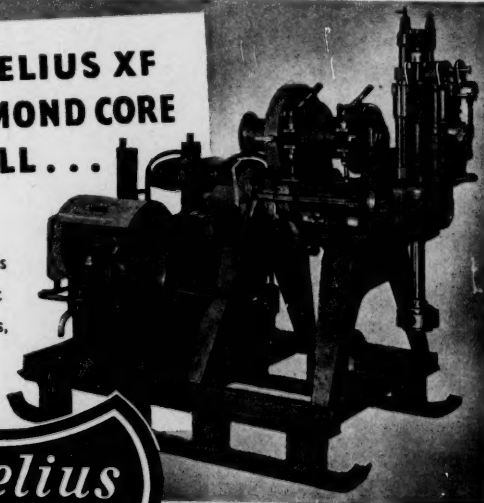
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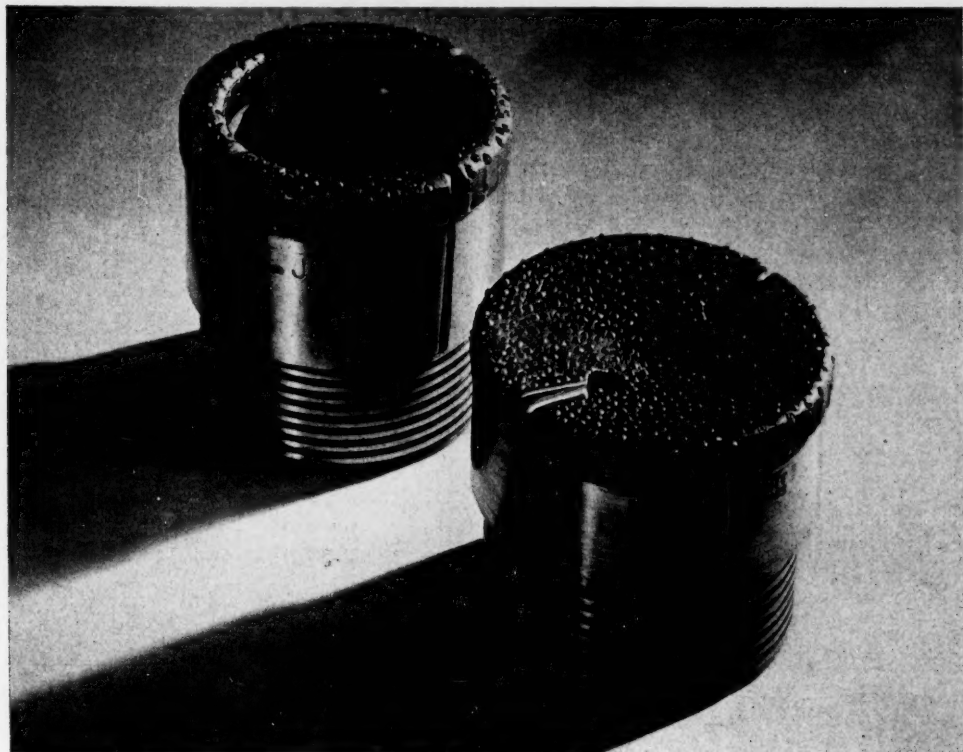
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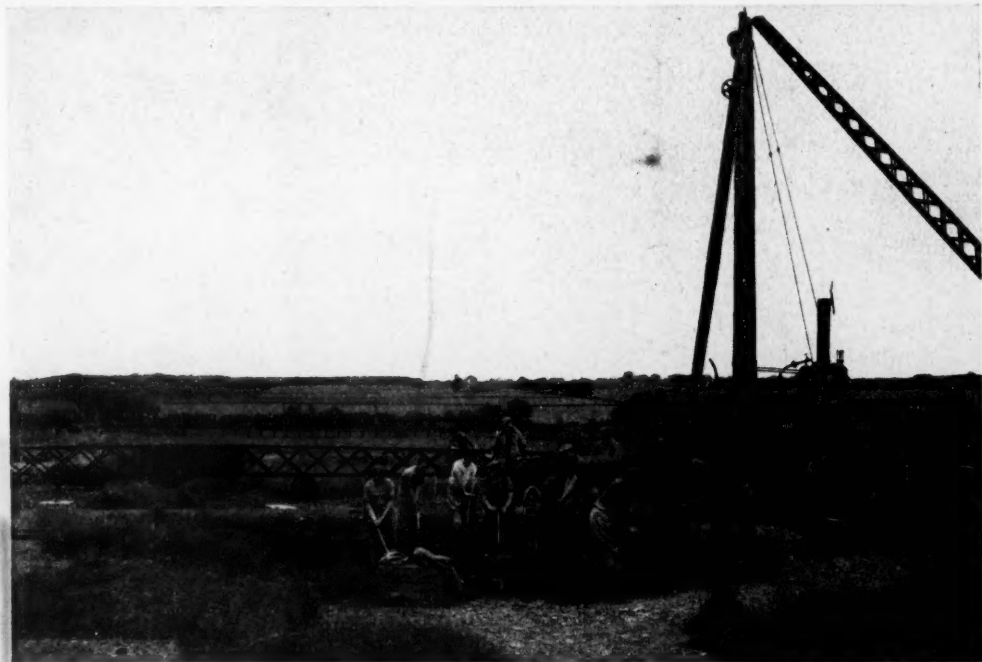


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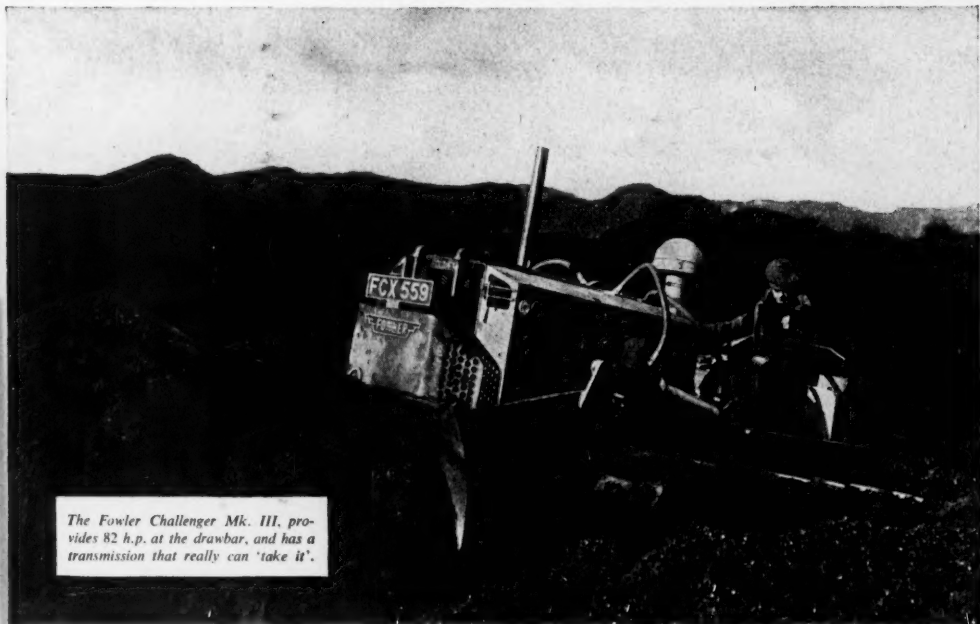
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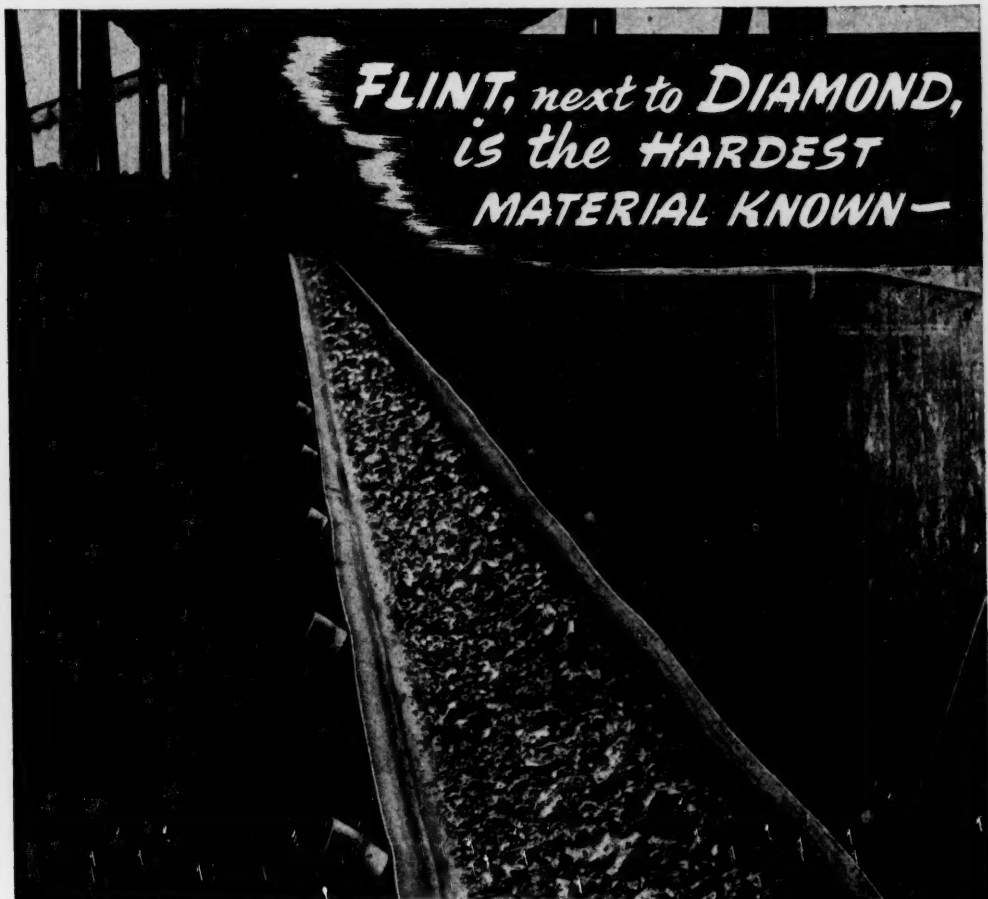
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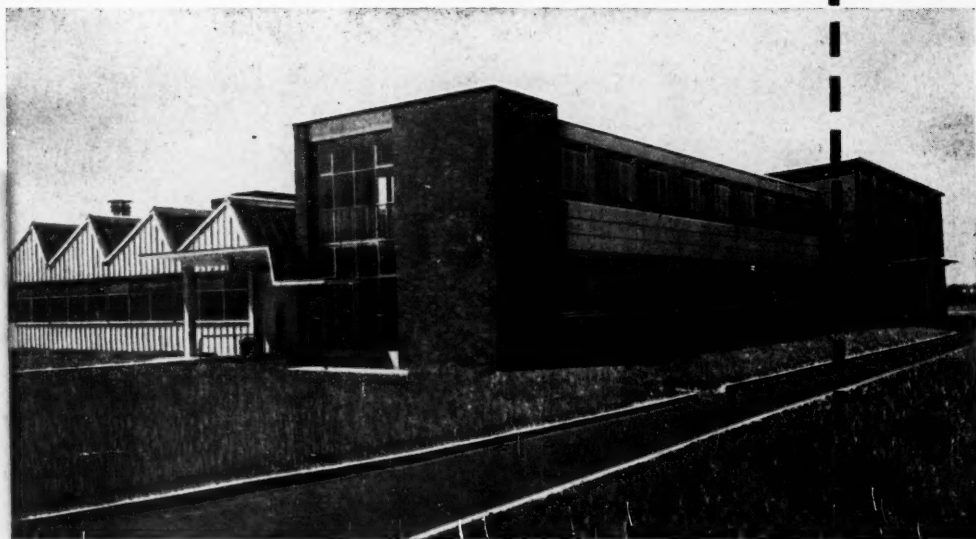
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# The Mining Journal

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## THIS WEEK'S FEATURES

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## NOTES AND COMMENTS

### Steel on the Ration

Steel, the vital raw material of thousands of industrial enterprises, great and small, is to go on the ration again on December 3. Most of us thought that this survival of war-time controls was dead and decently buried at the end of May last year, and there were few tears shed over the demise of a system which had long outlived its usefulness and remained only as an irritant in the national economy. By the unions it was condemned as "a sheer waste of man-power and materials"; the British Iron & Steel Federation affirmed that the system had failed to achieve any pretence to accuracy and could not be operated on any rational basis.

In the event, industrial freedom has been short lived. After an interval of a year and a half, the Government has decided to re-introduce a system of steel allocations which will be "similar to those in operation up to May, 1950." From December 3 no carbon steel (to which the Order will apply, and which amounts to 95 per cent of the steel used in the U.K.) will be obtainable without an "I.S." authorization which will only permit the acquisition of specific tonnages for specific purposes. Ostensibly for the purpose of assuming adequate supplies for re-armament and the equitable distribution of the remainder of the output to industries in the order of their national importance, the new system invests the various ministries with dictatorial powers, involves producers and consumers alike in an immense amount of clerical work, and offers no more than a doubtful assurance that industrialists engaged in work of considerable national importance will be able to rely on the receipt of the right types of material at the right time to ensure continuity of operations. Flexibility and adaptability to the changing needs of industry are essential conditions for the success of a rationing system. Experience does not suggest that those qualities will be amongst the more conspicuous characteristics of an unimaginative bureaucracy.

### Sulphur from Anhydrite

Arrangements for financing the United Sulphuric Acid Corporation Ltd., which is to produce sulphuric acid from indigenous deposits of anhydrite, have now been completed. The company was formed last April to erect and operate a plant for the production of sulphuric acid and it is expected to be in operation inside of four years when it should provide some 150,000 tons a year.

The capital requirements of United Sulphuric Acid Corporation, including working costs, are estimated at

£4,200,000 of which £1,200,000 will be subscribed in Ordinary shares by 11 participating companies in proportion to their agreed annual off-take of acid. These companies are also guaranteeing the interest on the remaining £3,000,000 required which is being raised in the form of Debenture stock and has been placed by Hoare & Co. of Crosby Square, with institutional investors. The stock carries interest at the rate of £4 7s. 6d. per cent and is redeemable by 15 equal and serial annual repayments beginning in 1956. The final redemption date is September, 1970. The trustees are Lloyds Bank. Both the Ordinary shares and the Debenture stock will be privately held and it is not intended to apply for a Stock Exchange quotation. The participating companies have also agreed to subscribe further Ordinary capital if necessary up to an amount of £1,200,000.

Anhydrite, the raw material required, is available in many places in this country. The last figure we have for anhydrite production in Great Britain, given in the Westwood report, was 911,814 tons in 1948. Reserves in the Billingham area are there stated to be at least 75,000,000 tons with many million tons elsewhere—altogether adequate supplies for many years to come.

The Corporation has entered into a contract with British Plaster Board for the supply of 240,000 tons a year. As is well known a plant of this kind depends for its economic operation on having available a satisfactory outlet for the cement clinker which is the important by-product. Accordingly the Corporation are negotiating an agreement with the Portland Cement Co. under which that company will purchase the cement clinker produced at the plant for at least 20 years, for use at a factory which they are proposing to build at Widnes on part of the land being acquired by the Corporation for its new sulphuric acid plant. The process used will be essentially the same as that already in use by the I.C.I. in their plant at Billingham, and an agreement has been concluded with the I.C.I. for the provision of technical knowledge of the process and supervision.

The formation of the Corporation, which involves the co-operation of 11 different companies, is a refreshing example of private enterprise responding to a demand the satisfaction of which at the present time is of particular importance, both from the point of view of its strategic value and from the standpoint of the saving of scarce dollars. By the same token, it can be assumed that its importance to the national economy will guarantee to it that the capital development required will receive the highest priorities from the Government departments concerned for the necessary materials and other resources.

The 11 companies participating in the scheme, together with their respective annual quotas of sulphuric acid in tons are as follows: I.C.I., 35,000; Fisons, 35,000; Courtaulds, 20,000; Clayton Aniline, 13,500; British Enka, 10,000; T. Bolton, 9,000; J. H. Dennis, 6,000; McKechnie Bros., 6,000; British Celanese, 5,500; Alumina Co., 4,500; Transparent Paper, 3,500.

### Tungsten Ore Development in India

Because of the critical supply position of tungsten ore and the high world prices ruling for it, the Indian steel

Because of the critical supply position of tungsten ore and the high world prices ruling for it, the Indian steel industry has been compelled to suspend manufacturing fresh tonnages of high-speed steel, writes a correspondent.

The only known deposit of tungsten ore in India occurs at the Rewat hill near Degana railway station in Jodhpur State, now integrated into Rajasthan. It was first discovered in 1913 and was reported upon in 1941 by Dr. J. B. Auden of the Geological Survey of India. The mines have been worked intermittently and attracted special attention during World War II, when intensive efforts were made by the Jodhpur Government to work the deposits. With the end of the war, the mines were closed down; however, in view of the present world situation, efforts are being made to re-open and develop them.

The mines are worked departmentally by the Mines and Geology Department of the Government of Rajasthan, which has its headquarters at Jaipur. There are altogether ten lodes and four stockwerks on the Rewat hill. All except one lode are believed to be exhausted now. The lodes in the form of vertical quartz veins were worked in the past by open cut as well as underground methods, and the stockwerks were quarried in the form of deep pits.

Besides the above primary sources of wolfram, there is a belt of what are termed as "eluvial" deposits by Auden all round the hill which contains wolfram. This is mostly weathered granite and forms the main source of wolfram now. It is being exploited by surface as well as underground workings at several places all round the hill. A new lode has been recently discovered within this belt; it is 8 in. thick and has been traced up to a depth of 6 ft., the exposed length being a little over 10 ft. In the weathered granite small patches of wolfram are found sticking to pieces of quartz held together by kaolinized felspar. It is overlain by wind-blown sand whose average thickness may be about 25 to 30 ft. The extent of the weathered granite at depth is not known as no systematic prospecting has been done so far in that area. The underground workings in the surrounding weathered granite is rather extensive on the west-south-west foot of the hill, where there are several galleries in operation. However, it is generally believed that these deposits extend all round the hill for a distance of 500 ft. from the foot of the hill. The yield of wolfram concentrate from the west-south-west of the hill varies from 20 to 22 lb. per 100 cu. ft., but the average figure may be about 15 lb.

The mined material is first crushed by hand pounding; wolfram is then separated by winnowing and jigging with "supas"; all done by hand; the final concentration is effected by dry panning. This final concentrate usually contains over 60 per cent  $WO_3$ ; but sometimes it may contain up to 69 per cent. Present monthly production from the mines is only  $1\frac{1}{2}$  tons of wolfram concentrate. Developed to its maximum capacity, the production may be raised to about 8 tons of concentrates per month or 100 tons per year. If this production is diverted solely to indigenous use and not exported, it would make India not only independent of imports, but also self-sufficient as regards the manufacture of high-speed steels.

## Portugal: What Next?

(From Our Own Correspondent)

Oporto, Aug 8

**Wolfram.**—The first six months have terminated with mining circles here asking the question, "What Next?" as the position is like a gate the key to which has apparently been mislaid. On the one hand the trade reviews have been clamouring about the "desperate scarcity" and "alarming shortage" of certain strategic materials, on the other hand every possible difficulty has been put in the way of increasing production and speeding up exports. The man in the street is not far wrong when he points out the contradiction between that which is being said and that which is being done.

Early in the year rumours began to circulate to the effect that the Ministry of Economy intended to levy a tax of Esc.36 on each kilo of wolfram concentrates exported. Shortly afterwards, and with a distressing lack of respect for contracts already closed or for the serious financial losses that such a measure must cause the trade, the rumour became an accomplished fact. Shortly afterwards, this time from the Ministry of Finance, came another measure, to wit, a fresh tax of Esc.40 per kilo of wolfram concentrates. This duplication led to some exporters, who had already paid the Esc.36, being required to pay another Esc.40. Much time, paper and talk led to the first tax being taken off—but the muddle and losses remained. This is why the question, "What Next?" is being asked.

If the price of 525/- per l.t. unit c.i.f. is maintained sufficient attraction is offered to induce concession owners to work and the tributer to collect; but if the export tax of Esc.40 is not taken off the picture will change. Portugal has two wolfram mines—Panasqueira and Borralha—both foreign owned. The other mines—so called—depend on the tributer for the majority of their supplies.

Exporters have been approached by buyers with requests for information regarding the possibilities of long term contracts at fixed prices. On paper this method would be most practical—if a solution to the "What Next?" problem could be found or guessed at.

There are certain matters not explained in the few details to hand at the moment regarding the decisions of the International Conference on the purchase and distribution of strategical materials. The matters of mixed  $WO_3/Sn$  residues, the lower  $WO_3$  ores or the just below standard ores, does not seem to have been mentioned. U.K. buys hundreds of tons of this class of material in the course of the year. Possibly these questions will receive attention in the future.

### EXPORTS—6 MONTHS (in tonnes)

TIN CONCENTRATES		CU. PYRITES	
	1950 1951		1950 1951
U.K. ... ..	553 291	France ... ..	90 100,432
U.S.A. ... ..	19.6 29	Belgium ... ..	66 80,919
Spain ... ..	19 69	Germany ... ..	26 41,966
		Holland ... ..	21 28,197
Total ... ..	591.6 389	Denmark ... ..	8 9,836
		U.K. ... ..	— 8,401
		Algeria ... ..	— 5,815
		Eire ... ..	— 3,723
		Tunis ... ..	3 1,650
		Total ... ..	214 280,939
WOLFRAM CONCENTRATES			
U.K. ... ..	1,191 1,255		
Sweden ... ..	27 36		
U.S.A. ... ..	— 250		
Germany ... ..	— 20		
Italy ... ..	— 11		
Total ... ..	1,218 1,572		
		White Arsenic	439 172
		Manganese Ore	— 4,973

**Tin.**—Nothing has so far come of the notification sent to exporters who had applied for export licences for cassiterite to the effect that those applications should be renewed. With the fall in the price of tin metal the Spanish market has been practically lost. Quite con-

siderable tonnages of both normal grade tin ore, low grade ore and tin slag are to be had on the market, and the closing of the door to exports is as hard to understand as is the action whereby difficulties are put in the way of exporting an ore that has only a small local sale.

The whole position can be called wholly unsatisfactory. The tax of Esc.40 will seriously affect the output of wolfram, just as the tax of Esc.15 on tin ore will affect the output of that ore. The export figures—given below—show that 354 more tons of wolfram were exported during the first half of this year than were exported during a similar period of 1950. It is likely that the total of this excess was composed of Spanish ore. That cassiterite exports are less by 203 tons than the figures for the first half of 1950 shows the effect of the tax of Esc.15 per kilo and the hold-up of exports. 47 tons of cassiterite were exported during June and 135 tons of wolfram.

It is no secret that many mine owners and exporters are in serious financial difficulties and may not be able to carry on business.

## Norway's Mineral Trade

(From Our Own Correspondent)

Oslo, August 14

The official report on the trade balance of Norway in the first half of the current year, just issued by the Central Bureau of Statistics, shows imports valued at Kr.2,576,500,000 (Kr.2,027,200,000 first half 1950), and exports Kr.1,853,100,000 (Kr.1,245,000,000).

### IMPORTS

Imports of coal were 649,653 tonnes (470,938 tonnes first half, 1950); coke imports, however, decreased to 112,686 tonnes (178,457); China clay shipments rose to 13,352 tonnes (9,356); gypsum to 15,760 tonnes (13,913); but cryolite fell to 905 tonnes (2,227). Imports of raw platinum increased three-and-a-half times to 1,146 oz. Imports of iron and lump ore at 653 tonnes showed a big decrease (14,945), as did bauxite, at 12,121 tonnes (19,402). However, manganese ore improved to 114,413 tonnes (46,593); chromite to 29,542 tonnes (22,226); alumina, to 30,003 tonnes (26,214), and zinc concentrates to 48,828 tonnes (37,711). Imports of raw copper fell to 647.7 tonnes (1,567.4), but copper and bronze rods at 330 tonnes and wire at 4,375 tonnes improved. Raw aluminium totalled 1,028 tonnes (461), and wrought aluminium, 578 tonnes (245). Raw lead totalled 5,037 tonnes (3,105); raw tin, 249 tonnes (219).

### EXPORTS

There was a large increase in iron and lump oreshipments at 14,345 tonnes (8,775), but iron ore concentrates fell to 95,200 tonnes (104,535). Iron pyrites, poor in copper, fell to 67,155 tonnes (90,168) and cupreous iron pyrites to 56,654 tonnes (107,460). Purple ore, however, improved to 23,363 tonnes (15,172). There was a big increase in molybdenite shipment which amounted to 178 tonnes (nil), and copper ore reached 4,542 tonnes (3,712). Raw aluminium exports rose to 21,821 tonnes (16,723), and wrought aluminium to 1,250 tonnes (799). Raw nickel increased to 4,938 tonnes (4,496). Raw zinc exports were lower at 14,700 tonnes (16,151). Zinc ashes and scrap amounted to 1,040 tonnes (383). Sulphur shipments improved to 39,349 tonnes (33,678); graphite, to 1,844 tonnes (671); mica to 299.8 tonnes (266.5).

In the iron and steel section pig-iron shipments were up at 21,500 tonnes (94,444); as were ferro-chrome at 12,198 tonnes (8,017), ferro-manganese at 43,809 tonnes (37,987), and ferro-silicon-manganese 13,410 tonnes (9,800); but ferro-silicon declined to 25,372 tonnes (26,239). Nitrate of lime shipments rose to 434,357 tonnes (399,540), and nitrate of soda to 2,015 tonnes (1,398). Calcium cyanamid declined to 14,134 tonnes (25,556).

## India and Pakistan

(From Our Own Correspondent)

Colombo, August 2

The Central Mica Advisory Committee of the Government of India is to discuss the future policy regarding the mica industry in India, special reference to export, and to the establishment of a technical school at Kodarma in the Hazzaribagh district in Bihar for the training of mica managers and the opening of a research institute at Kodarma. The Hazzaribagh district is the most important mica mining centre in the world where about 80 per cent of the world's mica is produced.

The Bihar *ad hoc* Mica Advisory Committee discussed the impending danger to the mica industry in Bihar as the result of attempts made in the United States for the commercial production of synthetic mica. The next meeting of the Committee will discuss, among other things, the request of certain Indian and European firms for importing Burmese and Brazilian mica to India for processing and re-export.

### LIGNITE DEPOSITS IN MADRAS

The project for the mining of lignite coal in South Arcot, Madras, would be a worthwhile and economically feasible one, according to British, Australian and German experts and technicians, whom Mr. H. Sitarama Reddi, Minister of Revenue and Labour, Madras, consulted during his recent trip to Europe. The Minister will shortly submit a report to the Madras Government on this subject. The question of the underground lake now standing in the way of the exploitation of lignite which lies in a strata underneath it, was specially mentioned by him to the experts. The Minister consulted experts in England on this matter and afterwards inspected a lignite mine in Germany and had consultations with Krupps and other concerns.

Two American experts have already inspected the lignite deposits of South Arcot district and reported that the quality of lignite available is very good and can be economically exploited, provided the problem of flooding of the mines is successfully tackled. The Geological Survey of the Government of India also showed that the lignite seams ran for several miles at a comparatively shallow depth.

### MINERAL DEVELOPMENT OF BALUCHISTAN

The Government of Pakistan has made plans for the industrial and mineral development of Baluchistan, which is stated to be rich in minerals. Presenting a picture of the development, Mr. Nazir Ahmad Khan, Minister of Industries, Pakistan, said that the grouping system of coal mines in Baluchistan has given a lift to the development of the coal mining industry. About half a dozen new companies are now prospecting for coal in new areas. This resulted in the production of more coal than in previous years and output now stood at 267,620 tons a year. Referring to oil resources, the Minister said that preliminary arrangements with regard to prospecting for oil in the Bugti area in Baluchistan have been finalized, and that drilling operations will be taken in hand within a month. There were also good prospects of oil deposits both in Kalat State and in Makran State.

Regarding the mining of sulphur, he disclosed that arrangements for restarting operations at Kohesulta in the Chagai district were nearing completion.

Other minerals found in Baluchistan are copper, manganese, gold, pyrite and asbestos. The Geological Survey Department is studying the prospects of exploiting these minerals on a commercial and economic basis. The thick labretic bed near Ziarat holds out prospects of iron and bauxite.

# Tin Mining in the Belgian Congo\*

By J. P. GUSTIN, du Centre d'Information de l'Etain, Brussels

The development of tin mining in this rather remote area in the heart of the African continent is of recent date, for although it commenced in 1913 the total tonnage won in the following twenty years amounted only to some 10,000 tons or less than one year's current production.

The first mines were opened by the Union Minière du Haut Katanga who began by exploiting tin deposits in the neighbourhood of their established copper mines. Since that time all tin from Belgian Congo has borne the name "Katanga" or UMHK although in fact it may come from other quite distant areas. Two other companies operate in Katanga; Geomines at Manono and Mwanza, and Sermikat at Bukema and Mitwaba. From 1916 Geomines took a leading place among producers, a position it retains to-day.

After the first world war (1914-18), prospecting revealed deposits of cassiterite in Maniema-Kivu, as well as Ruanda-Urundi, and new mining companies undertook their extraction. Difficulties prevented any large-scale development until the end of 1933, but since then it has been rapid. The companies Symetain (Kalima-Punia), Compagnie Minière des Grands Lacs (Kamituga), together with C. N. Ki, Kinetain, Belgikaor, Minerga and Miluba, steadily increased their production, as did Geomines and Sermikat in the Katanga, and Somuki, Minetain, Mirudi and Georuanda in the Ruanda-Urundi.

When, during the second world war (1939-45), the western world was cut off from its supplies of tin in the Far East, the Belgian Congo, at the request of the allies, stepped up production of tin by every possible means. In spite of a great scarcity of labour and the interruption of its links with the mother country, it managed to double its production, bringing it up to 17,000 tons annually in the three critical years 1943-4-5. The efforts made by these newly-developing mines had, however, been too sudden and at the end of the war immediate production had to give way to reorganization and development in the interests of permanent and orderly mining.

On the one hand, the richest deposits had been worked excessively, leading to an impoverishment of the average content of the reserves, and, on the other hand, some of the labour recruited for the mines was no longer available in peace-time. It was necessary, therefore, to adapt the methods of exploitation so as to be able to work deposits of lower value, and to push mechanization to the maximum. The conventional methods of mechanization did

not always prove economic, and their application to poor deposits presented problems of great difficulty. Recent years have therefore been devoted to developing the mechanical equipment of the mines, to improving methods of extraction and to constructing roads, dams, and hydro-electric installations; and at the same time to raising the standard of life of the native workers.

There are three distinct mining regions in which methods of development vary markedly as much because of the different characteristics of their deposits as on account of their differing topography. One feature, however, common to all three regions, is climate. Heavy rains fall abundantly for more than half the year, swelling torrents and rivers and often violently flooding the mine-workings and sweeping away the numerous bridges carrying the roads. In the dry season, on the other hand, the scarcity of water often slows down operations.

## KATANGA

The first region is that of Katanga, which is responsible for about 40 per cent of Belgian Congo output. It is a wooded plateau, moderately undulating, containing eluvial and vein deposits. As these are fairly localized they lend themselves well to modern methods of mechanized development.

The principal deposit is that at Manono, which Geomines linked by rail to the river Lualaba. The firm also built a hydro-electric station of 15,000 KVA, situated 90 kilometres from Manono. An artificial lake, Lukushi, provides a supply of water for the ore dressing plant throughout the dry season. The cassiterite is found as small grains in the altered pegmatite, as well as in the hard rock underneath; the latter has been worked only since 1950.

The ore in the altered pegmatite is excavated with mechanical shovels holding from 2 to 3½ cu. yd. and loaded through a mobile charging hopper provided with a grizzly on to belt conveyors of 20 to 32 in. in width (sometimes attaining a length of 1,600 ft.), which carry it to washing plants of suitable size (50 to 150 cu. metres per hour). The ore is freed from mud in log-washers, washed in reowashers, sized, and concentrated in jigs or on tables according to its fineness. Cassiterite obtained in this way still holds some impurities which are subsequently removed at the main concentrator by means of Denver jigs, Deister tables and magnetic separators.

The extraction of ore from rock has necessitated the installation of large breaking and crushing plants. After

\*From the July issue of *Tin and Its Uses*.





blasting, the rock is loaded by mechanical shovels of 6½ cu. yd. into hopper-wagons of 20 tons capacity, which carry it to a gyratory crusher at the bottom of the quarry.



Loading on to a belt conveyor

Thence it is transported by moving belts of 35 in. width and 27 deg. inclination to the crushing and washing stations. These plants are at the moment still being developed, and their production is steadily growing.

#### MANIEMA-KIVU

Maniema-Kivu, the second mining region, supplies over 50 per cent of Belgian Congo output. It is located in the heart of the equatorial forest in very hilly country. The forest is thinly peopled and the natural agricultural resources are scanty.

The ore deposits so far exploited are scattered in the valleys or on hillsides and are of limited size and seldom more than 3 meters thick. They are of both alluvial and eluvial origin. The construction of permanent washing plants has been possible in only a few cases. Where the site is suitable, the excavation of ore is by mechanical shovels and transportation is by conveyor belts. The ore is afterwards washed in sluices up to 100 ft. long and 5 ft. wide, or it may be first sized on fixed sieves and treated and classified in the usual way.

On terraces the ore is loosened by mining bars or by hydraulic monitors and carried by a current of water into launders from which it is delivered by gravel pumps or ejectors into sluices or jigs. In some cases the deposits can only be worked manually and this means a heavy labour bill.

The eluvial deposits are generally less rich in tin and are treated by hydraulic; the ore is sized on grizzlies and fixed sieves, or in other classifiers, and concentrated in sluices or jigs.

In this area much preparatory work has to be carried



Ore concentration on shaking tables

out before mining proper can be commenced, as for instance the construction of roads and water-races to the workings, clearing of trees and scrub, draining of marshy

flats, etc. These operations may absorb as much labour as is required for the extraction. The workings are often scattered widely apart and special workers' camps have to be erected on the site.

#### RUANDA-URUNDI

The third mining region is that of Ruanda-Urundi. It is sparsely wooded but very mountainous and the average altitude exceeds 3,500 ft. In contrast to Maniema, labour is abundant and there are ample agricultural resources and cattle.

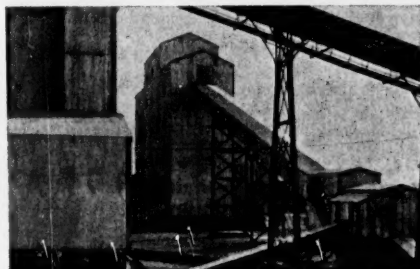
The deposits are principally eluvial and veins, and as water is scarce, the method of working is different from that of the first two regions. Hence the rotating pan is much used in Ruanda-Urundi, as its water consumption is small.

#### TIN SMELTERS

Geomines has at Manono a tin smelter equipped with two electric furnaces (3-phase, 1,000 and 850 KVA respectively) which can treat annually 10,000 tons of cassiterite and yield tin of 99.9875 per cent purity, which is the purest tin produced anywhere in the world by fusion methods.

Sermikat also treated cassiterite in its smelter at Lubudi during the war and up to 1946, but now this smelter has ceased working, and a large proportion of the cassiterite is being sent either to Hoboken (Belgium) or to America.

No description of the tin mines of the Belgian Congo would be complete without mentioning at the same time



A modern installation at Manono

the civilizing missions which the different companies have carried out. Having taken charge of a labour force which knew nothing of civilization, they have conscientiously tried to improve its material welfare and to broaden its spiritual horizon.

The mining centres are real towns where the workers have brick houses, often very attractive, and the hospitals, maternity homes and schools are more modern than in most civilized countries. Moreover, there are playing fields, recreation clubs and well-stocked shops.

The working camps are smaller villages of 1,000 to 2,000 souls, but the standard is at the same high level and there is always a dispensary, a school and a canteen. Agricultural pursuits are encouraged and developed.

Besides caring for material welfare, the mining companies have also endeavoured to foster spiritual teaching, and, with this object, they have helped the missionaries, and built churches and chapels.

In the space of a few years, and in spite of great natural difficulties, the tin mines of the Belgian Congo have certainly succeeded in attaining advanced industrial development, while preserving for their workers a social stability which this rapid development might well have upset.

## Rubber in Mining

By the late A. V. PAULL, M.I.M.M., and J. GALLAWAY, B.Sc., A.M.I.M.M.

A survey entitled "Rubber in Mining," on which the following article is based, has lately been compiled under the auspices of the British Rubber Development Board and should be of great interest to all those concerned with the mining industry. The authors have treated the subject from the point of view of the practising engineer, special attention being devoted to applications which tend to cut mining costs.

During recent years chemical research has brought into being a range of rubber compounds of such durability that they can be used as strong, flexible engineering materials. Rubber compounds of a wide range of hardness have found numerous applications in the mining industry. The answer to rising costs is increased mechanization, and it is under these circumstances that rubber becomes indispensable. Such items of equipment as hoses, conveyor belts, vanner belts, etc., would hardly be possible unless rubber was available for use in their construction.

### PROPERTIES OF RUBBER COMPOUNDS

The properties of rubber compounds which make them such valuable materials for use in the mining industry are: (1) resistance to abrasion, cutting, tearing and impact; (2) corrosion resistance; (3) electrical resistance, and (4) shock absorption. One of rubber's most important functions in mining is to resist abrasion and to protect more easily abraded materials such as metals against wear. Abrasion resistance is dependent upon rubber's ability to deform under strain and to recover its original form almost at once. Types of abrasion vary, and the type that predominates in any given application must be carefully considered. Resistance to tearing and cutting is closely related to abrasion resistance, and the type of compound suitable for the one is, generally speaking, also suitable for the other.

Compounds of rubber can be produced which will resist actual immersion for long periods in any of the inorganic acids except those of strong oxidizing character. Materials of this type are used extensively for the lining of vessels for the storage of corrosive chemicals. The electrical resistance of rubber is well known and has led to the use of rubber compounds for numerous applications where this property is important. Coming to the property of shock absorption, rubber compounds are extensively used for the insulation of shock, vibration and noise. "Silent-bloc" fittings and "vibro-insulators" are good examples of this type of application.

While discussing rubber compounds and their properties, mention should be made of "Linatex" rubber, which is a special form of rubber manufactured in Malaya from fresh rubber latex by a patented process. It is 95 per cent pure rubber, made entirely without heat or mastication,

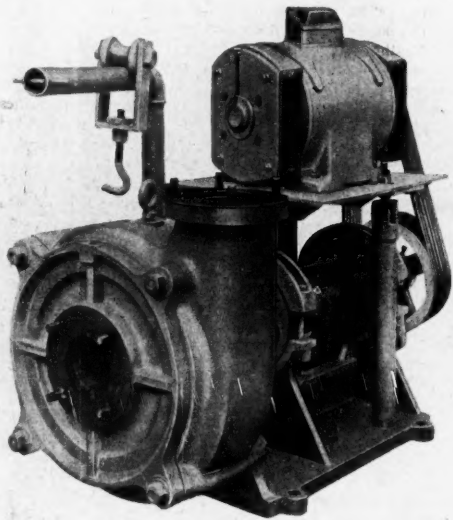
and possesses to a high degree the properties of abrasion resistance, corrosion resistance and shock absorption.

### ESSENTIAL TO INCREASED MECHANIZATION

The post-war urgency to develop new sources of supply has led mining engineers to appreciate the value of rubber as an indispensable material in the application of modern mechanized methods to exploration and rock-breaking. One of the outstanding properties of rubber is its "deformability." This makes the material appear to be plastic, and yet when the load is removed it recovers almost 100 per cent. This property is made use of in the Bucyrus-Erie blast-hole drill. In this churn-drill the derrick head, shock-absorber and rubber insulated heel and spudding

beam sheaves protect the machine from harmful shocks. The makers claim that the derrick head shock absorber gives the tools extra reach, then instantly snaps them back the moment the blow is struck. With maximum penetrating power thus concentrated in the hole, faster penetration is assured.

The heavy loads in deep drilling, quarry equipment, colliery machinery, draglines, excavators, etc., impose severe stresses on clutch and transmission parts. Air-flex clutches prove ideal for this duty, since they protect the machinery and shafting from destructive stresses by absorbing shocks and vibrations. The clutch itself consists of a ring-shaped cord-reinforced rubber gland of a special patented form with freely flexing side walls. Engagement is effected by allowing compressed air to enter the inner cavity; this expands



The Linatex Pump—made by Wilkinson Rubber Linatex, Ltd.

the clutch and engages the friction surface.

Rubber has found one of its outstanding applications in the production of transmission belting both above and below ground. Illustrative of the advance in this field of engineering is the more general use of V-belt drives, mainly because they have proved their ability to save space, provide positive power, start and stop smoothly, run quietly without vibration, and last longer than ordinary flat belts.

In the important sphere of dust prevention during mining operations, rubber is also playing its part. The improved "Hay-Edwards" dust trap, for use with pneumatic percussion drills, consists of a suction hood and filtering appliance. The suction hood is constructed of a light non-ferrous metal and fitted with two pivoted spring-steel jaws, the outer faces of which are provided with serrations.

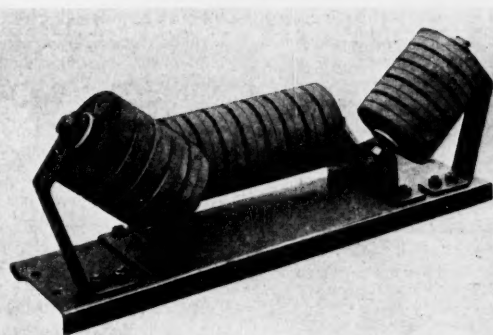
Attached to the face of the suction hood is a light collapsible rubber skirt. The dust passage within the suction hood is in the form of an annular space so restricted in width as to prevent large pieces of rock from being drawn into the apparatus. To the inlet of the suction hood is attached a 15 in. length of light non-kinking rubber and canvas hose, which is in turn connected to the filtering apparatus.

The use of rubberized ducting has been found excellent as a semi-permanent installation for the ventilation of face of stopes and drives. This ducting is made of rubberized canvas with a ring of stiff rubber at each end of a length. Junction between adjacent lengths is effected merely by inserting one ring within the other; air pressure then expands the inner ring to make an absolutely tight joint of a streamlined nature. Tests have shown clearly that rubberized tubing has a lower resistance than metal ducting to air flow. Another advantage is its flexibility, while the main disadvantage is liability to be torn by sharp rock edges.

#### ABRASION RESISTANT

To withstand severe abrasion steel pipes may be lined with crepe rubber or vulcanized rubber. At the Perak, Malaya, workings of the Kinta Kellas Tin Dredging Co., Ltd., the feeding of concentrates from the screen distribution box to the lower set of tables involves the passage of approximately 40,000 cu. yd. of sand per month through six steel pipes 3 in. long and 8 in. in diameter. The problem of abrasion is a severe one, and in 1928 the Sengat Rubber Estate Ltd. lined these pipes with  $\frac{1}{2}$  in. thick crepe rubber. Without the liner the pipes have an estimated life of two weeks, but with the crepe their life is extended up to as much as ten years. Steel pipes with rubber lining vulcanized to the metal of the pipe have been used for conveying sand for the filling of stopes. Besides standing up to the abrasive action of the sand they also present less friction to the flow, owing to the smooth rubber surface. For example, one string of rubber-lined pipes passed 750,000 tons of sand with a reduction in the thickness of the rubber walls from  $\frac{1}{2}$  in. to  $\frac{3}{16}$  in., whereas when ordinary standard pipes were used, the pipes were worn too thin for further use after passing 30,000 - 40,000 tons, even though they had been given a quarter turn every week. Rubber-lined pipes have also been used for handling acid mine water.

Apart from the rubber lining of complete lengths



Richard Sutcliffe's Impact Idler—used as shock absorbers at loading and transfer points

By Courtesy of Richard Sutcliffe, Ltd.

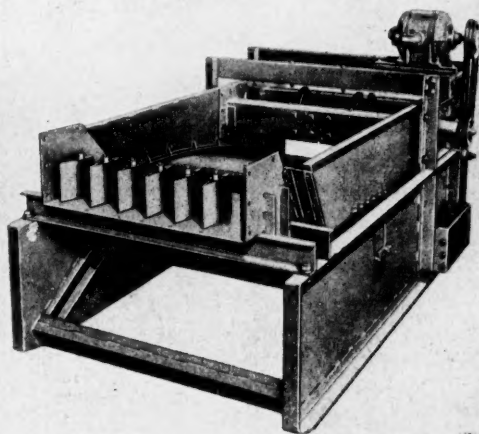
rubber stator which, while it has sufficient resilience to handle abrasive-laden water with minimum wear, is also very strong.

#### RUBBER LININGS IN PUMPS AND LAUNDERS

Abrasion is often particularly severe in the pumps handling ore pulps. At the present time many makers of sand pumps are using rubber linings in their pumps for the purpose of combating this severe abrasion, and are also protecting the impellers of the pumps with a rubber covering. Some of these rubber liners are of the slip-in type, others are bonded to the metal of the pump, while another type uses a built-up impeller of Linatex rubber. The Linatex pump, made by Wilkinson Rubber Linatex Ltd., of Camberley, Surrey, is so constructed that all parts in contact with the material being pumped are made of Linatex rubber. It can be classed as a horizontal spindle, end suction, centrifugal pump, and besides being capable all the usual duties of a sand pump can also handle corrosive fluids. The framework of the impeller consists of relatively thin metal front and hub plates connected by a series of pins passing through vanes of solid Linatex rubber. The casing of the pump is lined throughout with Linatex rubber. Another feature of the design is the Linatex patented hydrostatic gland, which consists essentially of two

circular Linatex rubber seals. The Linatex coverings on the casing, impeller, etc., when eventually they become worn, can be repaired or renewed by the makers, so that the metal parts can be used repeatedly.

The Stokes glandless centrifugal pump, made by R. O. Stokes & Co., Ltd., London, is a vertical rubber-lined sand pump designed for trouble-free pumping of abrasive solids, but can be adapted to the pumping of corrosive pulps. All wearing parts are rubber-covered to give the maximum length of life possible, the heat-cured rubber being bonded to the metal.



Symonds Rod Deck Screen made by the Nordberg Manufacturing Co.

By Courtesy of Nordberg Manufacturing Co.

It is an unfortunate fact that the best abrasion-resisting rubbers are not as good from a chemical resistance point of view. Each pumping problem must therefore be considered from its own standpoint, the best grade of lining for use being arrived at as a compromise between the proportion of abrasive to corrosive qualities of the pump.

The replacement of liners is an expensive item in the cost of ball-milling. In the last three to four years a ball mill of new design, using Linatex rubber to form the walls of the cylinder, has been placed on the market. It has been very successful and efficient in operation, but has not been used for grinding hard ores. The largest size manufactured at present is 3 ft. 6 in. internal diameter, the makers being the Wilkinson Rubber Linatex Ltd., who have on trial a 7 ft. diameter mill, based on the same method of construction, which, it is hoped, will be successful in the field of primary grinding of ore.

Rubber is also used for lining launders where the life of wooden or steel launders is excessively short. It is not unusual for the rubber lining to last four or five years where previously steel has worn away in a few months. Special forms are available, which can be supplied to the mines in sheets together with the necessary cementing material for attaching the rubber to the launder.

#### THE USE OF RUBBER IN VIBRATING SCREENS AND VALVES

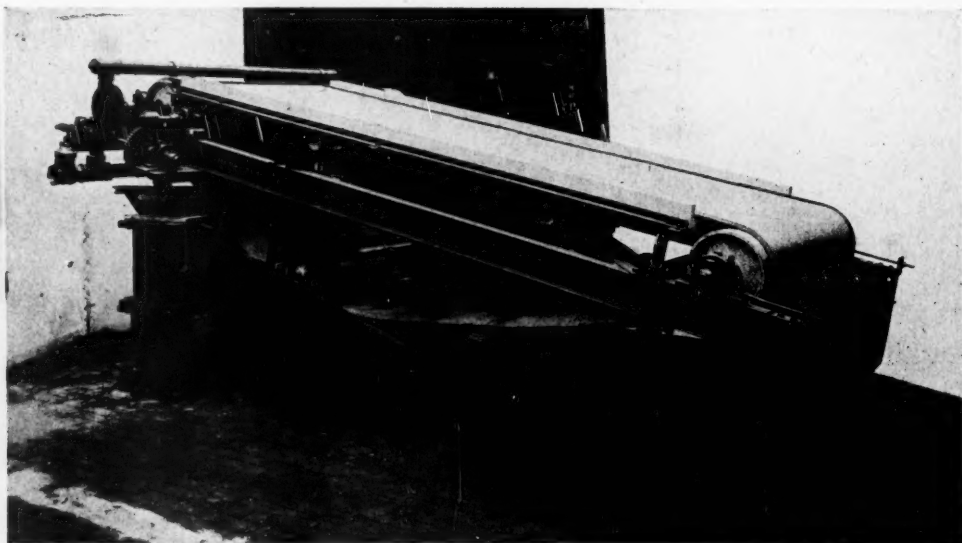
In the construction of vibrating screens, rubber parts are used, mainly as resilient connections between fixed and oscillating parts of the machine. The Symons Rod Deck Screen, made by the Nordberg Manufacturing Co., Milwaukee, provides good examples of this type of appli-

cation. The feed end of the screening deck is supported by a rubber rocker, which constrains the motion to a line of vibration at approximately 30 degrees with the horizontal. The discharge end is floated on coil springs with rubber buffers. The drive from the motor to the vibrator unit is through a flexible coupling, rubber parts being used to give the required flexibility. The vibrator weight is held almost in balance by coil springs, but when a speed of several hundred revolutions is attained the weight throws out against a rubber stop and the full vibrating force is developed. The screen surface consists of round steel rods, and these are held in position at the correct spacing by means of moulded rubber spacers.

The P.B. vibratory screen made by Plowright Bros. Ltd., of Chester, has all moving parts, with the exception of the vibrator, carried on patent rubber pivot bushes which eliminate the necessity for lubrication.

The flow of pulp and water through pipes is controlled by means of valves. One of the most efficient valves for this service is the Saunders diaphragm valve, which controls the flow through the valve by means of a rubber diaphragm. Troubles usual in the ordinary valve, which depends for its accuracy on accurately machined and lapped surfaces, to say nothing of stuffing boxes and packing, are overcome by the use of the rubber diaphragm as a seal for both opening and closing, and also for segregating the working parts from the pulp being pumped.

Rubber is playing a key part in almost every mechanical appliance used in exploration and rock-breaking, in transport, and in the treatment plant. The type and quality of rubber compound suitable for any particular application should be decided in consultation with manufacturers who specialize in the production of rubber compounds for mining purposes.



Fraser & Chalmers Continuous Blanket Table with continuous rubber belt compound of Linatex.

*By Courtesy of Fraser & Chalmers Engineering Works.*



## North British Diesel Hydraulic Locomotives

The completion, by the North British Locomotive Co. Ltd., Glasgow, of the first two of a standard range of Diesel hydraulic locomotives which embody the Voith-North British hydraulic transmission is an interesting event in the development of Diesel traction. One of these is in operation at the Corby works of Stewarts and Lloyds and the second at the North British works in Glasgow.

The builders state that simplicity is the keynote of the design of this 200 h.p. 0-4-0 type of locomotive which weighs 32 tons. Designed for general yard and railway work, the short wheelbase is claimed to render it specially suitable for any type of medium shunting work. The transmission is built up as a unit with the final drive and reverse gearbox and the driver's controls are limited to throttle, reverse lever and brake. There is no change speed gearing or clutch, and transmission wear is consequently reduced to a minimum. The change from one hydraulic circuit to the next, up or down, is completely automatic and the onus for changing gear at the correct road speed is not placed on the driver. The transmission is engaged on the opening up of the throttle through mechanical linkage from throttle lever to oil supply pump. The change-over from one stage to another is dependent only on the road speed and is controlled by a mechanical governor driven from the output shaft. This governor, therefore, selects automatically the circuit which is to be engaged and thereby controls the output of the engine.

Some units have been built in this country but the major developments have been continued by the J. M. Voith Co. of Germany. Over 2,000 locomotives and railcar transmissions have been placed in service, ranging in power from 50 h.p. to 1,400 h.p. through one transmission. The majority of these units have been confined to Europe, but a few have operated successfully in Australia for many years. Several units are being manufactured in this country for overseas use and fair numbers are also being exported from Germany.

### THE HYDRAULIC TRANSMISSION

The principle of power transmission through the medium of the kinetic energy of the oil in a hydraulic torque converter was first applied to marine steam turbine propulsion by Dr. Föttinger, prior to 1910 and the development in the field of Diesel railway traction has been carried out by the Voith Co. and extended to locomotives, road and overland vehicles and tractors. The North British Locomotive Co. has now acquired the British manufacturing rights, and also rights covering certain other territories.

The system consists basically of two or more fluid circuits comprising torque converters and/or fluid couplings. The converter has a torque increasing ratio up to six times the input torque and provides high tractive effort at starting and on steep gradients. At a predetermined road speed, the load is taken over automatically by the second and third converter or coupling according to the number of circuits employed, for the medium and high speed range while the first converter circuit empties.

The converter has three main members; the impeller, the turbine runner and the guide wheel. The impeller acts as a pump and transmits kinetic energy to the oil, which in turn imparts energy to the runner. The oil is led back to the impeller by the guide wheel, completing the circuit and effecting the reaction which makes torque conversion possible. Impeller and runner are housed in a common casing to which the guide wheel is fixed.

### SMOOTH ACCELERATION

The coupling consists of two similar parts with radial vanes, one of which acts as the impeller and the other as the runner. The runner is fixed to the output shaft and is surrounded by a casing which revolves with the impeller.

The impeller is driven by the input shaft, and centrifugal force acting on the oil imparts an increased pressure at the outer periphery of the wheel, setting up a circulation through the runner and driving the output shaft. The high operating efficiency of the fluid coupling is employed to the best advantage at full speed.

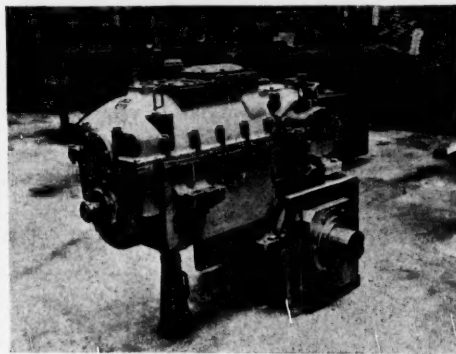
The control which the driver exercises through the throttle lever engages the transmission when the lever is moved away from idling. A filling valve opens in the delivery line from the centrifugal supply pump in the sump of the transmission casing, and the mechanical

governor directs the oil to the converter. When the throttle is opened up and the vehicle has gathered way, the action of the governor fills the coupling and empties the converter. An overlap allows this to happen concurrently so that the flow of power is uninterrupted while the load is smoothly accelerated.

In the 200 h.p. locomotive, the transmission unit is the type L33y in which there are three hydraulic circuits: a torque converter for starting and low speeds, and two fluid couplings, one for the medium and one for the higher speed ranges. In each circuit,

the input shaft drives an impeller which acts as a pump, imparting energy to the oil in the circuit and driving a runner which is geared to the output shaft. While the engine is idling the transmission is disengaged. Movement of the throttle lever away from the idling position opens a filling valve in the delivery line from the pump, situated in the sump, which supplies oil to the driving circuits, and the governor directs the oil to the converter. When the throttle is opened up and the locomotive has gathered speed, the action of the governor fills the first coupling and empties the converter at a predetermined road speed. As the speed of the locomotive continues to rise, the governor directs the oil into the second coupling also at a fixed road speed, emptying the first coupling.

If greater resistance is encountered when ascending a gradient, the governor will automatically cut out the top speed coupling and fill the intermediate coupling. The driver does not even have to touch the throttle handle and provided no speed restrictions were in force, this process both up and down would proceed indefinitely according to the resistance at the rail. A filling valve lock is provided in the driver's desk by which the valve can be locked in the closed position. The engine can then be run up independently without moving the locomotive.

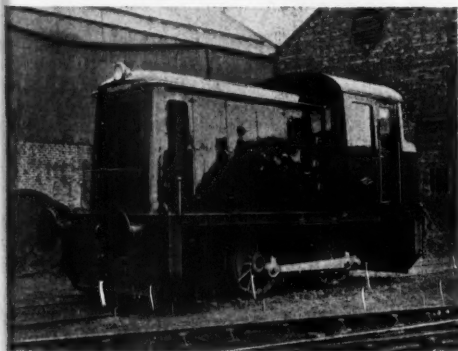


Voith-North British Hydraulic Transmission

The oil circuits are engaged and disengaged smoothly and concurrently so that the flow of power is steady and uninterrupted while the load is being accelerated. It is not necessary to reduce the engine speed manually nor to provide for clutching operations, and the uninterrupted acceleration allows the maximum speed to be attained more rapidly. There is no mechanical connection between driving and driven parts. Smooth application of power is available under any condition of loading and shock cannot be transmitted to the engine. Economy in maintenance is therefore to be expected, and this is especially to be found in the transmission itself, in which practically no wear takes place in the parts which transmit power. The transmission can in fact stand up to a tremendous amount of abuse without failure.

#### THE POWER UNIT

The power unit of the locomotive is the Davey, Paxman type 6RPH six-cylinder in-line four-stroke engine, which has a continuous rating of 200 h.p. at 1,000 r.p.m. The cylinder bore is 7 in. and the stroke  $7\frac{1}{2}$  in. The combustion system is the Ricardo Comet Mark III. The crankcase is a one-piece casting of great rigidity which carries the crankshaft in underslung bearings. The cylinder liners are dry, and are chromium-plated for prolonged life. The pistons are heat treated 'Y' alloy castings. The C.A.V. fuel pump and injectors are controlled by the Paxman hydraulic governor throughout the engine speed range. The engine lubricating oil pressure is used as a medium to operate the fuel pump control, so that in the event of a pressure failure the engine is automatically shut down.



200 h.p. Diesel hydraulic industrial shunter

The main frames are built up as a welded structure of heavy section steel plates. Ample access to the engine compartment is provided by doors on each side of the superstructure, which is itself removable in detail or as a unit for repair work. The fuel tank is in the roof of this compartment and the fuel oil flows by gravity to a gear pump which ensures a constant flow to the injection pumps.

Leading dimensions and particulars of the locomotive are:

Length over buffers:	23 ft. $5\frac{1}{2}$ in.
Wheelbase:	6 ft. 0 in.
Wheel diameter:	3 ft. 6 in.
Weight in working order:	32 tons
Tractive effort:	21,500 lb.
Maximum speed:	12 m.p.h.
Minimum radius of curve:	75 ft.
Fuel oil capacity:	155 gallons
Battery:	24 volt.

## Machinery & Equipment

### Westinghouse Pneumatic Colliery Schemes

Two Divisions of the National Coal Board have recently ordered pneumatic mining equipment from the Westinghouse Brake & Signal Co. Ltd.

At Nook Colliery No. 3 Pit, North Western Division, both surface and underground decking plant and automatic gates will be installed, with equipment for the control of tubs in the main cages. The uncoupling point will be equipped with tub stops and Model "10" retarders, while point control gear and further retarders are also specified. A single-sided retarder will operate at the foot of the creeper.

For Barnsley Main, the North Eastern Division's order provides a scheme of pit-top decking plant and automatic gates, pneumatically-operated keps, and tub control gear for the main cage. Using guillotine-type doors, the operation of the "fulls" and "empties" airlocks is to be automatic. Point control will also be automatic at the former airlock.

### Sutcliffe Mechanical Handling Equipment

One of the latest additions to the range of beautifully produced illustrated brochures issued by Richard Sutcliffe Ltd., Universal Works, Horbury, Wakefield, Yorks., describes the company's mechanical handling equipment.

Many of the details and illustrations in this brochure, which is entitled "Gate and Trunk Conveyor Components," refer specifically to the mining industry and the company points out that these components are incorporated in industrial installations in factories, workshops, quarries, sand and gravel pits, generating stations, gasworks and on all sites where belt conveyors and accessories are used.

The brochure gives details of: Gate Tail Ends (with full particulars of the company's Mark III type); Fixed Tail End with Low Type Hopper, incorporating Impact Idlers; Transfer Points with Fixed Type Tail End and the company's Fully Floating Tail End, the fitting of which is recommended on a long conveyor with the gradient against the load and also where the load is likely to fluctuate.

### A New Range of Crushers

Sir W. G. Armstrong Whitworth & Co. (Ironfounders) Ltd., of Close Works, Gateshead-on-Tyne, have recently acquired the sole rights to manufacture, in this country, the Straub range of Kue Ken Jaw Crushers, suitable for crushing all classes of rocks and minerals. Of the many novel features incorporated in these machines engineers and quarry owners will be specially interested in the fool-proof lubricating system and the safety device which are built into the full range of crushers. Lubrication is by means of a direct driven pump which pumps hundreds of gallons per minute of oil from a built-in reservoir and fully floods both eccentric shaft and toggle plates. The whole of this system is made dust proof, which eliminates excessive wear on all lubricated parts. The pump is fitted with a special control valve which automatically stops the power drive in the event of the oil level in the reservoir falling to the safety mark.

The safety device should particularly interest all who use crushers for slag reduction. It is a simple but unique mechanism built into the crusher flywheel, which again cuts out the power drive in the event of foreign matter such as tramp iron entering the crushing zone of the machine. The mechanism can easily be set to suit different requirements.

In addition to jaw crushers the company is also building a range of gyratory crushers, and these machines will also be fitted with the same patent mechanisms.

## Metals, Minerals and Alloys

Intense efforts are being made by the United States administration to avoid the threatened strike in the copper industry. The strike called by the Metal Trades Council of the A.F. of L. for Monday last has been postponed indefinitely as a result of Federal representations. The date for a strike fixed by the C.I.O. Organization—the I.U.M.M.S.—is next Monday, August 27, and this walk-out will probably be similarly postponed. However, the generally disturbed feeling in union circles is further shown by a strike of guards and conductors of the South Buffalo Railway serving the Lackawanna works of the Bethlehem Steel Co., as well as the Ford stamping plant at Woodlawn, the Federal Portland Cement Co. and the Buffalo Slag Co.

**Copper.**—Mr. Wilson, the Mobilization Chief, said that President Truman has authorized loans from the strategic stockpile of 25,000 tons, of which 10,000 tons have already been transferred, corresponding to the loss of output from the Garfield Smelter. These supplies are to be restored to stockpile by June 30 next, unless replacement would be inimical to national defence. Meanwhile, current withdrawals for the stockpile are suspended. However, the possibility of a complete halt in metallurgical production early in October is being prophesied.

The outlook for copper supplies in the U.S. is regarded pessimistically by producers. One leading copper producer spokesman said he expected to be pushed for supplies for a very long time to come. Scrap supplies have virtually dried up. A spokesman of the Laurel Hill Refinery said they had never seen scrap supplies so low. Some of the famine is no doubt due to the general withholding of scrap movement in anticipation that domestic prices would have to be raised. Imports of ore and matte during the first six months of 1951 are reported as 51,904 s.tons (58,396 in the first half of 1950); blister imports as 79,876 s.tons (97,543), and refined as 114,328 s.tons (171,844). Exports were 72,003 s.tons against 78,285 a year ago.

The International Materials Conference was to consider a report by its working group on specific proposals for international allocations of copper and zinc, at the end of last week.

Exports of copper from Chile in July improved to 19,363 tonnes in July, but were substantially below the 25,762 tonnes shipped in July, 1950. In New York it is reported that Chile is sending no copper to the U.S. as she can sell more profitably elsewhere.

U.K. imports of copper in July were 31,311 tons (19,387 electro, 11,924 blister). The June import was 33,973 tons.

**Lead.**—There is little to notice this week in regard to lead. It is expected that the Senate will agree shortly with the House Bill, to suspend the U.S. import duty, but it is not yet known whether purchases of foreign lead will be exempted from the allocation to consumers. Imports of lead into the U.S. for the first half year are computed at 82,725 s.tons as compared with 202,126 s.tons for the same period of 1950.

U.K. imports in July were 13,222 tons (of which 9,899 tons were from Australia), against 16,580 tons in June.

Under a recent E.C.A. agreement with the Greek Government, 5,000 tons of lead concentrates are to be delivered to the U.S. over the next four years.

**Tin.**—There is little fresh news regarding tin this week. The R.F.C. price is unchanged at 103c. per lb. and negotiations with Bolivia appear to be still in progress. Imports of concentrates into Malaya in July amounted to 855 tons (Thailand 719, Burma 136). Indonesia exported 2,120 tons

of tin in concentrates in July compared with 3,136 tons in June; making the seven -months'-total 17,934 tons against 16,940 tons a year ago. Shipments to the U.S. were practically unchanged at 707 tons, but shipments to Holland were just over 1,000 tons less. Mr. Stewart Symington, administrator of the R.F.C., told a Congressional Committee in a statement on international and domestic activities of the Corporation that the Longhorn Smelter was now producing about 50 per cent of the current U.S. industrial consumption. He continued his war dance on the prostrate corpse of an imaginary international tin cartel, but apparently produced nothing fresh.

Bolivian exports in June declined to 2,718 tonnes from the high level of May, when they totalled 3,923 tonnes. Total for the half year is 17,354 tonnes compared with 15,690 tonnes in the first half of 1950.

The R.F.C., at the request of the Bolivian Government, has extended its offer to purchase Bolivian material for a 30/90 day period at 112c. per lb. for a further week. The Bolivian Government said the extension was necessary to obtain the agreement of producers. Mr. Stuart Symington expressed the belief that the 112c. price had been accepted in principle and that an agreement was in sight.

U.S. tinplate and blackplate shipments for the first half of the year totalled 2,767,110 s.tons (2,523,573 s.tons a year ago). Electrolytic plate and blackplate totals were up at 1,425,811 and 486,998 s.tons respectively, but hot dipped plate was lower at 854,301 s.tons.

U.K. imports in July were 1,310 tons of metal (June 406 tons); and of concentrates 4,817 tons (June 6,761 tons), of which Bolivia supplied 3,140 tons and Nigeria 1,441 tons.

**Zinc.**—Zinc continues extremely short generally. Imports of slab zinc into the U.S. in the first half of the year fell to 47,388 s.tons compared with 76,788 s.tons for the same period last year, with concentrates totalling 149,449 s.tons against 126,286 s.tons a year ago. U.K. imports in July were 11,449 tons (13,953 tons), and concentrates were 15,060 tons (17,704 tons in June).

**Aluminium.**—Production of primary aluminium in the U.S. in the first half of the year is reported at 403,500 s.tons, the highest since 1944. The U.S. occupation authorities promise substantial aid to the Japanese export trade: production at the present time is approaching an annual rate of 36,000 tons, with the potential rate around 77,000 tons maximum. Under the recent agreement of the E.C.A. Mission with the Greek Government 450,000 tons of bauxite are deliverable to the U.S. in the next four years.

U.K. imports of aluminium in July were 20,757 tons (June, 18,257); bauxite imports were 43,148 tons (18,900 in June).

**Molybdenite.**—Molybdenum, like tungsten, has now been placed under a special domestic allocation programme in the U.S. but this does not extend to the respective ferro alloys. In a statement issued by the U.S. Secretary of the Interior, Mr. Oscar Chapman, molybdenum is one of the few metals in which the U.S. is more than self-sufficient, the percentage being given as 116 per cent. Norway has again entered the list of exporting countries. U.K. imports in July were 138 tons compared with 227 tons in June.

**Nickel.**—Shortage of nickel is said to be driving small consumers out of business in the U.S. where a grey market has developed up to \$5.50 per lb., as against the regular market price of approximately 70c.

U.K. imports of nickel in July were 443 tons (June, 295 tons), and of concentrates and matte 3,759 tons (3,930 tons in June).

**Quicksilver.**—The U.S. price for domestic delivery has been lowered to \$195/200 per flask, but the price here is reported still unchanged. U.K. imports in July were 152,484 lb. (85,949 lb. in June).

**Silver.**—Output of domestically mined silver in the U.S. for the first half of the year is reported at 22,357,000 f.oz. compared with 19,965,000 f.oz. in the first half of 1950. Total production, including that from imports for refining, for the half year was 41,649,000 f.oz. against 38,354,000 f.oz. for the first half of last year.

## The London Metal Market

(From Our Metal Exchange Correspondent)

In spite of no fresh news being available as to any progress in the negotiations between the R.F.C. and the Bolivian producers on the price to be paid to the latter for the supply of tin concentrates for the Texas Smelter, the London Market since our last report has developed a very firm tone. Values have advanced by about £60 per ton for cash tin and by about £44 for the three months position up to Wednesday afternoon of this week, showing a widening of the backwardation from £25 to about £40 per ton.

Trade has been rather quiet with very little cash metal on offer. Demand from consumers has been on the slow side whilst Continental enquiry has not been brisk, probably owing to the fact that this time of the year is the holiday season. Stocks of tin in London Metal Exchange official warehouses for the week ended August 18 showed a decline of 73 tons and stood at 1,393 tons.

On Thursday the official close on the tin market was: Settlement price £950, Cash Buyers £950, Sellers £955; Three months' Buyers £900, Sellers £905. In the afternoon the market was easier. Turnover for the day was 250 tons. Approximately turnover for the week was 735 tons.

The Eastern price on Thursday morning was equivalent to £874 7s. 6d. per ton c.i.f. Europe.

The negotiations between the American authorities and Bolivia are still in progress and as we go to press it is learned that the Bolivian Government has asked for an extension of the offer to purchase concentrates on the basis of 112c. for tin. Mr. Symington is understood to have intimated that the new materials procurement agency would act for the purchase of tin metal for the stockpile while the R.F.C. would continue to purchase tin concentrates.

This news, together with the uncertain situation in Persia and Korea, is probably to some extent accountable for the sharp rise in prices which occurred on Thursday on the London Metal Exchange.

## Iron and Steel

Unlike the recent increase in prices which was imposed without preliminary notice, industry has been given ample warning of the Government's intention to introduce a new system of steel rationing on and after December 3. So far as the new allocation scheme has been delineated it appears to be very similar to the old system of war-time control which survived until May, 1950. Before any purchases of carbon steel can be effected, buyers will be required to obtain I.S. authorization, which will only be issued for specific tonnages for specific purposes. The new arrangements will not apply to building or civil engineering firms, and authorizations will not be needed to obtain less than a ton of steel in any one quarter. Alloy steel will be the subject of a separate announcement, and the present arrangements for controlling sheet steel, tinplate, terneplate and black plate, remain unchanged. Iron and steel stock holders will again need licences to acquire controlled types of steel for re-sale.

In industrial circles this preliminary announcement has been received with dismay. It interposes an immense documentary barrage between producers and consumers,

and presages endless difficulties in the acquisition of supplies even for essential purposes.

Detailed examination of the new price schedules confirms the impression that, formidable though some of the rises are, they still leave British prices below Continental levels. Even the German quotations—generally the lowest in Western Europe—are slightly higher than the new U.K. prices, and French and Belgian quotations are very much higher.

No. 3 foundry iron delivered Birmingham is advanced 11s. 6d. per ton to £11 4s. 6d., haematite at £12 17s. 0d. in the N.W. and N.E. Coasts is up 9s. 6d. and basic iron is advanced 16s. 6d. per ton to £11 15s. 6d. in all districts. Soft basic billets now quoted £21 16s. 6d. per ton, a rise of £4 7s. 6d., are still in short supply and are eagerly sought by re-rollers, whilst amongst finished steel products the principal rises amount to £3 14s. 0d. per ton in the case of sections bars and joists, and £4 3s. 6d. per ton for ship and boiler plates. The biggest advance is £6 2s. 6d. in the price of black sheets, but the new domestic price of £35 15s. 6d. is well below the German level of £40 10s. 0d. per ton and the demand far outpaces the supply. Steel makers are now in fact adopting a cautious policy in regard to new sales, and are also operating under strict control in regard to all export orders.

### AUGUST 23 PRICES

#### COPPER

Electrolytic ... £234 0 0 d/d

#### TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

#### LEAD

Soft foreign, duty paid ... £180 0 0 d/d  
Soft empire, including secondary lead ... £180 0 0 d/d  
English lead ... £181 10 0 d/d

#### ZINC

G.O.B. spelter, foreign, duty paid ... £190 0 0 d/d  
G.O.B. spelter, domestic ... £190 0 0 d/d  
Electrolytic and refined zinc ... £194 7 0 d/d

#### ANTIMONY

English (99%) delivered,  
10 cwt. and over ... £390 per ton  
Crude (70 %) ... £305 per ton

#### NICKEL

99.5% (home trade) ... £454 per ton

#### OTHER METALS

Aluminium, £124 per ton. Platinum (scrap), £27.  
Bismuth, 25s. 9d. lb. Platinum, £27/£33 5s. nom.  
Cadmium, 18s. 9d. lb. Rhodium, £45 oz.  
Chromium, 5s. 11d. lb. Ruthenium, £30 oz.  
Cobalt, 17s. 6d. lb. Quicksilver, £73 10s./£74  
Gold, 248s. f.o.z. ex-warehouse.  
Iridium, £65 oz. nom. Selenium, 25s. nom. per lb.  
Magnesium, 1s. 6d. - 2s. lb. Silver (bar), 78½d. f.o.z. spot  
according to quantity. and forward.  
Osmiridium, £35 oz. nom. Tellurium, 19s. lb.  
Osmium, £70 oz. nom.  
Palladium, £8 10s. oz.

#### ORES, ALLOYS, ETC.

Bismuth ... 30% 12s. lb. c.i.f.  
... 20% 9s. 6d. lb. c.i.f.  
Chrome Ore—  
Rhodesian Metallurgical (lumpy) £13 per ton c.i.f.  
" (concentrates) £13 per ton c.i.f.  
" Refractory £12 12s. per ton c.i.f.  
Baluchistan Metallurgical ... £13 18s. 6d. per ton c.i.f.  
Magnesite, ground calcined... £26 - £27 d/d  
Magnesite, Raw ... £10 - £11 d/d  
Manganese, Best Indian (Nominal)  
Molybdenite (85% basis) 103s. 6d. per unit c.i.f.  
Wolfram (65%), U.K. 525s. nom. c.i.f.  
Tungsten Metal Powder 35s. nom. per lb. (home)  
(for steel manufacture)  
Ferro-tungsten ... 33s. nom. per lb. (home)  
Carbide, 4-cwt. lots ... £30 3s. 9d. d/d per ton  
Ferro-manganese, home £39 9s. 4d. per ton  
Ferro-manganese, export Nom.  
Brass Wire ... 2s. 7½d. per lb. basis.  
Brass Tubes, solid drawn ... 2s. 1½d. per lb. basis.



# The Mining Markets

Lack of definite news from Kaesong and Teheran caused investors to adopt a "wait and see" attitude last week, with the result that trading in stock markets was reduced to small proportions.

However, hopes that at the forthcoming meeting of the International Monetary Fund a higher gold price might be approved, aroused speculative interest and kept Kaffirs firm. Initially, Paris buying was chiefly responsible for the better trend, but later in the week local orders were in evidence helping to swell demand. Several Rand dividend payers hardened, Brakpan, Springs, Vogels and Robinson Deep all being better off. Of the higher priced issues, Durban Deep, Daggafontein, East Geduld, Sub Nigel and Consol Main Reef also showed small advances. Spaarwater, on rumours of another good payshoot having been uncovered, were a good market but late in the week reacted slightly and finished up 3s. 6d. after being as high as 3s. 9d.

Selected non-producers also went ahead. Wit Extensions stiffened on continued talk of Jeanette being floated and the "Freddies" group, Harmony and the two Presidents all hardened. Doornfontein in the Far Western Rand group gained 1s. to 30s. 9d. and West Dries strengthened its position on rumours of good development results.

West Africans continued their recent improvement and under the lead of Ashanti, which advanced 1s. 3d. to 28s. 9d. and Bibiani which finished the week 6d. up, this was a firm market section.

Australian golds tended to be featureless apart from Gold Mines of Kalgoorlie, Great Boulder Prop and Corderoy Mines which attracted attention on the chairman's remarks at the annual meeting, going ahead 2d. to 7d.

Although one or two Rhodesian golds advanced, move-

ments were small—the market not responding to the news that their case to enter the premium sales market would be put before the I.M.F. next month.

Coppers were quietly firm, Rhodesian Selection Trust put on 10½d. to 18s. 9d. reflecting somewhat tardily the arrangement to bring into production the new Chibuluma prospect. Chartered and Selection Trust both hardened, while Paris support helped to lift Roan a few pence to 10s. 6d.

Lead-zincs attracted little attention and New Broken Hill receded 6d. to 27s. 9d., as did Rhodesia Broken Hill, which dropped 4½d. to 22s. Contrariwise, Lake George was a good counter and on the week showed an improvement of 6d. to 24s.

Tins did not, generally speaking, react favourably to the recovery in the metal price.

After the statement from Siamese Tin Syndicate and Bangrin Tin Dredging concerning their interest in the Wanlockhead-Leadhills lead-zinc mines in Scotland, details of which were reported in our issue of August 10, both shares eased 1s., but Siamese Tin made up most of the lost ground later in the week. The official communication stated that the option over the Wanlockhead-Leadhills area recently acquired, would not expire until September 30, 1954, during which time stockholders would have ample opportunity to express their views at the annual general meetings. Expenditure involved, it was stated, during the first year was no greater than is customarily expended annually in searching for new areas.

Siamese Tin, as previously reported, is carrying out a preliminary geological investigation and can withdraw at any time it so desires. In any case the board's policy is not confined entirely to mining in Siam.

Little interest developed in oil shares, the uncertainty as to the outcome of the Stokes' mission putting off buyers, and most share prices eased slightly. Exceptionally, Attock gained 7½d. to 24s. 4½d.

FINANCE			O.F.S.			MISCELLANEOUS GOLD			TIN (Nigerian and Miscellaneous)		
	Price	+ or -		Price	+ or -		Price	+ or -		Price	+ or -
	Aug. 22	on week		Aug. 22	on week		Aug. 22	on week		Aug. 22	on week
African & European...	3 1/2	+	Alpha F.S.A.	13/-	-3d	G.F. Rhodesian	8/3	-1 1/2d	Amalgamated Tin	10/9	-
Anglo American Corp.	8	+ 1/2	Blinkfont	28/9	-	London & Rhodesian	5/-	-	Barrat Tin	22/-	-8d
Anglo-French	21/10	-	Central Mining F.S.	5/-	-1 1/2d	Motapa	2/10	- 1/2d	Bischi	4/-	+1 1/2d
Anglo Transvaal Consol.	40/-	-	Freddies	12/6	-	Mysore	6/3	-	British Tin Inv.	16/9	-3d
Camp Bird	12/10	+ 1 1/2	Freddies N.	11/9	-	New Guinea	2/-	+ 1 1/2d	Ex-Landis Nigeria	6/10 1/2	+1 1/2d
Central Mining (1/1 shrs)	41/10	-7 1/2	Freddies S.	14/11	-	Nandytrook	7/9	+3d	Geveer Tin	13/9	-4 1/2d
Consolidated Goldfields	43/9	-7 1/2	F.S. Geduld	3 1/2	-	Ooregum	3 1/2	-	Gold & Base Metal	3/6	-3d
Consol. Mines Selection	32/6	-	Geoffries	27/6	-	Oroville	12/-	+3d	Jantar Nigeria	7/-	-
East Rand Consols.	4/6	-	Harmony	26/6	-	St. John d'El Rey	4/9	-	Jos Tin Area	11/-	-
General Mining	51	-	Lydenburg Estates	11/10 1/2	-	Zans	33/9	-	Kaduna Prospectors	4/-	-
H.E. Prop.	36/3	-1/10	Middle Wits	2/6	-				Kaduna Syndicate	6/-	+3d
Henderson's Transvaal	11/3	-7 1/2	Ofits	4/6	+1 1/2				London Tin	3/-	-3d
Johnnies	3 1/2	+ 1 1/2	President Brand	23/3	+6d				Ribon Valley	1/1 1/2	-
Rand Mines	6 1/2	-	President Steyn	19/3	+3d				United Tin	2/6	-
Rand Selection	41/10 1/2	-	St. Helena	30/7 1/2	-						
Union Corporation	10 1/2	-	U.F.S.C. & G.	10/-	-						
Vereniging Estates	6	-	Virginia Deb.	7/9	-						
Wits	33/1 1/2	-	Virginia Ord.	14/6	+3d						
West Wits	47/6	-	Welkom	39/4 1/2	+7 1/2d						
			Western Holdings	3/8	-						
RAND GOLD			WEST AFRICAN GOLD			DIAMONDS			SILVER, LEAD, ZINC		
Blyvoors	48/6	+3	Amalgamated Banket...	14/-	-3d	Anglo American Inv.	4 1/2	- 1/2d	Broken Hill South	54/9	+3d
Brakpan	19/6	+ 1/2	Ariston	7/1 1/2	-	Casts	36/6	- 1/2d	Burma Corporation	37/1	-
City Deep	3 1/2	- 1/2	Ashanti	28/9	-	Cons. Diam. of S.W.A.	34	+ 1/2	De Beers Deft. Bearer	161	-
Consol. Main Reef	21	-	Bremang	10/11	+6d	De Beers Pld. Bearer	161	-	Consol. Zinc	34/-	+3d
Crown	4 1/2	-	G.C. Main Reef	3/6	-				Lake George	24/-	+6d
Daggas	4 1/2	-	G.C. Selection Trust	8/-	-				Mining Trust	7/9	-
Dominion Reefs	17/4	-1 1/2	Kwahu	4/-	+1 1/2d				Mount Isa	47/-	+3d
Doornfontein	30/9	+1 1/2	London & African Mng.	1/10 1/2	-				New Broken Hill	27/9	-6d
Durban Deep	34 1/2	-	Lydenburg Deep	1/1 1/2	+1 1/2d				Rhodan Broken Hill	71/9	-9d
E. Daggas	25/-	-	Martins	19/9	-				Rhodan Broken Hill	22/-	-4 1/2d
E. Geduld	2 1/2	- 1/2	Nanwa	5d	-1 1/2d				San Francisco Mines	33/9	-
E. Rand Props.	4 1/2	-	Taqua & Abosso	6/10 1/2d	-				Trepca	4/1 1/2	-4 1/2d
Geduld	39/4 1/2	+7 1/2d									
Grootevlei	17/9	-6d	AUSTRALIAN GOLD			COPPER			MISCELLANEOUS BASE METALS & COAL		
Libanon	22/-	+3d	Boulder Perseverance	3/3	-	Chartered	17/9	+6d	Amal. Collieries of S.A.	61/3	-
Lupatards Vie	21/6	-	Gold Mines of Kalgoorlie	14/-	-3d	Indian Copper	4/1 1/2	- 1/2d	Associated Manganese	91/-	-2/3
Mariavale	5/8	-	Great Boulder Prop.	6/6	+3d	Messina	51	- 1/2	Chinese Engineering	2/9	-
Modderfontein B.	41/3	-	Great Western Consol.	2/9	-	Nebane	67/1 1/2	- 1/2d	C.P. Manganese	49/4 1/2	-
New Kleinfontein	32/6	-	Lake View and Star	20/-	-3d	Rhod. Anglo-American	21/-	- 1/2d	Natal Navigation	5/8	-1
New Pioneer	30/9	-	Mount Morgan	17/9	-	Rhodan Selection	18/6	+10 1/2d	Wandie	22/6	-3d
Randfontein	19/-	-	North Kalguri	9d	-	Rhokana	21/-	-	Witbank Colliery	4x0	-
Robinson Deep	14/6	-3d	Parina	9d	-	Rio Tinto	10/6	-1 1/2d			
Rose Deep	35/-	-1/10 1/2	Sons of Gwelo	9/9	-	Roan Antelope	45/7 1/2	+1 1/2d	CANADIAN MINES		
Simmer & Jack	6 1/2	+4 1/2d	Western Mining	7/4 1/2	-	Tanks	47/9	-9d	Dome	113 1/2	+1 1/2d
Springs	10/3	-	Wiluna	12/1 1/2	-	Tharsis Sulphur Br.	51/3	-	Hudson Bay Mining	11/10	-
Sub Nigel	3 1/2	-							International Nickel	178x0	-1 1/2
Van Dyk	15/6	-	MISCELLANEOUS GOLD			TIN (Eastern)			Mining Corp. of Canada	68/-	-
Venterspost	30/3	-3d	Can and Motor	33/1 1/2	-	Anglo-Burma	2/9	-	Noranda	1147x0	+2
Vlakfontein	19/-	-	Champion Reef	10/-	-	Ayer Hitta	28/4 1/2	-1 1/2d	Queomont	68/-	-
Vogelsvlei	28/3	-	Globe & Phoenix	23/9	-9d	Bangrin	31/3	-1 1/2d			
West Driefontein	4 1/2	-				Gopeng	127/4x0	-7 1/2d	OIL		
W. Rand Consolidated	43/1 1/2	-				Hongkong	10/3	-	Anglo-Iranian	5 1/2	- 1/2
Western Reefs	43/1 1/2	-				Ipoh	28/9	- 1/2d	Apex	47/6	-1/3d
						Kamunting	12/-	-3d	Attock	24/4	+7 1/2d
						Kepong Dredging	12/6	-	Burma	45/1 1/2	-2/6
						Kinta Tin Mines	14/6	-	Canadian Eagle Bearer	36/1 1/2	-1/2
						Kramat Pulai	4/9	-9d	Siamese Eagle	28/1 1/2	-4 1/2d
						Malayan Dredging	14/-	-	Shel	4 1/2	- 1/2
						Pahang	11/4 1/2	-	T. P. D.	38/9	-2/6
						Pengkalan	12/4 1/2	-4 1/2d	Ultramar	31/-	-1/2
						Petaling	17/9	-			
						Rambutan	13/6	-1 1/2d			
						Siamese Tin	29/6	-			
						Sourin	25/3	+9d			
						S. Malayan	18/9	-			
						S. Tronoh	9/-	-3d			
						Sungai Kinta	28/6	-			
						Tekka Taiyong	28/6	-			
						Tronoh	28/6	-			

## Company News & Views

### Geevor Tin's Special Case

Mr. G. W. Simms, the chairman of Geevor Tin Mines, has issued some supplementary remarks to the recently published annual report in which he deals with the reasons why the company did not limit its final dividend to that permitted under the White Paper proposals on dividend limitation. It is stated that a material factor contributing to the very successful result of the year's mining operations was an arrangement entered into with the workmen through their Union under which the company undertook to pay to the men a substantial bonus. This arrangement was based on the principle that workmen as well as stockholders should share in the benefit of an unusually successful year. The reference to this bonus payment in the annual address makes this point clear.

When, therefore, the Chancellor of the Exchequer made his announcement the directors were faced with the position of already being committed to the payment of the bonus to the workmen, and unless they were prepared to adhere to their recommendation regarding the dividend they would be violating the principle on which that bonus payment was based, and stockholders would receive a lower rate of dividend than in the previous financial year.

The directors are also of opinion that Geevor is definitely a special case under the policy set out in the White Paper, and as that Policy itself has not yet been enacted they feel it their duty to allow their dividend recommendation to stand. They, however, wish to point out that in the event of the White Paper Policy becoming law they will be precluded from paying any further dividends before the accounting period ending March 31, 1953, unless the company is permitted to do so as a special case. Failing that, the dividend for the accounting period ending March 31, 1953, would be limited to 2½ per cent, and thereafter during the period of dividend limitation the maximum annual rate allowed would be 17½ per cent.

It has been decided, the chairman concluded, to circulate these supplementary remarks before the annual general meeting so that stockholders may be aware of all the facts when considering the dividend recommendation made. The accounts and chairman's address were in print in proof form before the Chancellor made his statement on dividend limitation and there can be no doubt that the profit earned justified the dividend recommended. (Geevor's final dividend distribution was 35 per cent, making 50 per cent for the year, whereas the permitted ceiling under the White Paper proposals was only 17½ per cent).

### Indian Copper Reconsiders Sulphur Project

Year	Tons Milled	Yield % cu	Conc. s.tons	Refined Copper l.tons	Rolled Metal l.tons	Ore Reserves s.tons	% cu
1950	386,156	2.081	32,150	6,614	8,058	3,087,195	2.51
1949	352,272	2.047	28,180	6,390	9,921	2,798,430	2.52

Indian Copper Corporation has good cause to regard its mining operations during 1950 as satisfactory. Tonnage milled has not been bettered since 1941; output of copper concentrates and refined copper have not been improved upon since 1939 and 1940 respectively; ore reserves at the year end constituted an all-time record and although the total footage driven at 9,581 ft. was 229 ft. less than in the previous year, payability increased 5.4 per cent to 63.5 per cent—the highest since 1945.

The financial results were also pleasing, and if the net profit of £62,531 was slightly less than the £65,552 earned in the previous year, it was struck after meeting a heavier taxation burden, £347,000 against £343,000, and allocating £210,651 against £185,000 to reserves. The dividend was maintained at 12½ per cent absorbing a net

amount of £59,994 and the balance remaining, £2,537, was carried forward making a total amount of £40,103 against £37,566 brought in.

Sir Godfrey Fell, chairman, in his address, gave production results for the first five months of the current year which showed that tonnage milled was even higher than in the corresponding period under review as was the output of products and refined copper. However, he pointed out that sales of kyanite, which last year gave the company a profit of £90,516 (£31,071), are likely to be lower in the current year as the Government of India have recently curtailed export of this product. On the other hand, the world shortage of sulphur has brought the company round to reconsider the possibility of recovering sulphur products from the roaster and smelter gases at Moubhandar. At present, the company is awaiting the report on the project from an "eminent expert" who is investigating the property.

### Western Mining Corporation's Shareholdings

Year to Mar. 31	Dividend Income £A	Gross Revenue £A	Expenses £A	Net Profit £A	Dividend 6d.	Forward Balance £A
1951	106,922	128,152	26,541	101,611	6d.	487,296
1950	105,113	183,031	28,827	154,204	6d.	455,544

The feature of the report and accounts of Western Mining Corporation for the year to March 31, 1951, was the reduction in profits from sales of Investments and fixed assets which fell to a mere £A64 from £A58,888. Thus, despite a slightly higher dividend income arising mainly from distributions received from Central Norseman Gold and Gold Mines of Kalgoorlie both gross revenue and net profit declined. Nevertheless, there was ample cover for the dividend payment of 6d. per 5s. share (same) and the forward balance was left £A31,752 better off at £A487,296.

Western Mining Corporation's interests extend over all Australia and in company with Gold Mines of Australia act as general managers and consultants to the various companies in the Group. The following table shows the Corporation's interests as at March 31, 1951.

Name of Company	Share or Stock Units Held	Percentage of Issued Capital	Net Profit £A	Forward Balance £A
*†Central Norseman .....	1,312,500	50%	115,929	117,869
*†Gold Mines of Kalgoorlie ...	369,782	30%	163,290	37,979
*†New Coolgardie .....	532,000	62%	83,859	81,629
*†G.E. Western Consol. ....	500,000	14%	—	—
†Kalgoorlie Southern .....	153,340	20%	—	—
G. M. of Australia .....	260,500	62%	2,697	18,991
*Central Victoria Dredging .....	395,500	50%	33,253	52,358
Victoria Gold Dredging .....	110,600	44%	Dr. 4,792	55,971

\*Operating Company

†Corporation acts as Manager and Consultants

A 20 per cent interest in Kalgoorlie Southern Gold Mines, the company recently formed by Gold Mines of Kalgoorlie to test for a southern extension of the Kalgoorlie goldfield, was acquired during the year by the Corporation.

### Corderoy Finds Zinc of Good Value

Mr. C. Lakin-Smith, at the annual meeting of Corderoy Mines said that the company's Wheel Ellen lead mine in Australia had now been found to contain zinc as well as lead, both in the mine and in the dumps.

The dumps on assay averaged 3 to 5 per cent zinc and it was expected that as good, or even better, results would be obtained from the mine. It was hoped that production would start within 12 months.

## Topical News in Brief

**Aluminium for Winding Drums.**—A report appearing in *The Northern Miner* states that the use of aluminium for the winding drums of mine engines reduces considerably the effects of inertia on these drums and also the starting and stopping torques required at high speeds.

**O.F.S. Railway.**—Work has begun on a second railway through the new goldfields of the O.F.S.

The first railway was built from the main Free State railway system to Odendaalsrus, and the new route will continue the line nine miles further west to Allanridge.

**Nordberg Generating Sets for Australia.**—Nordberg Manufacturing Co. of Milwaukee are to supply the New South Wales Government with generating sets costing about £600,000, according to the Prime Minister, Mr. Menzies, says Reuter. The equipment will add 500,000 kW. to the New South Wales power station output.

**Shell to Make Sulphur at Stanlow.**—A sulphur recovery plant has been installed at the Shell refinery at Stanlow, Ellesmere Port, Cheshire, which will recover 10,000 tons of sulphur per annum from oil. An acid plant is also being installed to convert waste sulphuric acid sludges to fresh sulphuric acid. The total cost of these projects is estimated at between £500,000 and £600,000.

**Canadian Gold Production, 1950.**—Production in 1950 totalled 4,448,178 f.o.z. compared with 4,123,518 f.o.z. in 1949 and with 5,345,179 f.o.z. in 1941, the peak year. Ontario contributed more than half the total in 1950. The increase in output, however, came mainly from Quebec where production was almost 136,000 f.o.z. greater than in 1949, and almost 10,000 oz. greater than in the peak year of 1941. Output from Ontario and Manitoba also increased but that from British Columbia continued to decrease.

**Mining and Quarrying in Northern Ireland, 1949.**—The 1949 report of the Northern Ireland Ministry of Commerce on the mining and quarrying industries in Northern Ireland states that the total output of minerals in 1949 was 2,977,383 tons, valued at £1,479,278 compared with 2,203,947 tons valued at £1,030,270 in 1948. The output of coal in 1949—mined in two small coalfields in Ballycastle—was 650 tons. The mining and quarrying industries during the year employed a labour force totalling 2,713 compared with 2,641 in 1948.

**Barrow Iron and Steel Works to be taken over by I. & S.C.**—The Iron and Steel Corporation of Great Britain has agreed to take over the Barrow Iron and Steel Works from the Ministry of Supply, but the United Steel Co. Ltd., a publicly-owned company, will continue to manage the works as they have done for the Ministry of Supply.

The Hoop Mills are being modernized and improved at a cost of £150,000 and a further £60,000 is being spent on an experimental pilot plant to try out a new process for continuous casting of steel billets. Steel production is expected to be limited to that required to feed the Hoop Mills and owing to raw materials shortage, two out of seven open hearth furnaces may be shut down shortly.

**Greek Mining Interests Sign E.C.A. Contracts.**—Contracts with the E.C.A. have been signed by Greek mining interests for the procurement on U.S. Government account of ores such as manganese, lead, bauxite, etc.

It is understood that the ore purchases will be paid for out of the special American aid account in drachmae. The tonnage of bauxite and lead ore to be delivered to the U.S. over the next four years is put at 450,000 tons and 5,000 tons respectively, although the quantities of other ores to be delivered during the same period has not yet been estimated.

These contracts follow on the series of agreements concluded between the Greek Government and the E.C.A. mission to Greece on drachma Counterpart Fund Allocations for carrying out the Greek reconstruction programme.

**Norwegian Firm Gets Snowy Mountains Contract.**—The Snowy Mountains Hydro-Electric Authority is to accept the tender of Selmer, Oslo, for the design and construction of the Cuthega project, the first section of the £20,000,000 Snowy Mountains scheme, according to Reuter's Sydney correspondent. The contract price is between £3,000,000 and £4,000,000 and completion is scheduled for June, 1954. Provision is made in the acceptance for an "incentive" bonus if the work is completed before that date—and also a penalty charge if it is behind schedule.

The two 30,000 kW turbo-alternators to be installed initially have already been ordered from the British Electric Co., Ltd., and provision is to be made for a third generator to bring ultimate capacity to 90,000 kW. Work to be carried out includes construction of a dam on the Snowy River, a three-mile tunnel, surge tank, 3,500 ft. pipe-line, and powerhouse.

## NARAGUTA KARAMA AREAS

The Twenty-Fourth Annual General Meeting of Naraguta Karama Areas, Ltd., was held on August 21 in London, Mr. Herbert T. Skipp (the Chairman) presiding.

In the course of his statement (circulated with the report) the Chairman stated that tin ore production for the year ended December 31, 1950, was 154½ tons. Expenditure showed appreciable increases compared with 1949, and in connection therewith the chairman reported that a new agreement had been entered into between the Nigerian Mining Employers' Association and the Nigeria African Mineworkers' Union, with effect from July 7, 1950, providing, inter alia, for an increase in the minimum basic wage; and that by an Order in Council dated September 12, 1950, royalty percentage rates had been increased by 1 per cent. for every rise of £100 per ton in the price of metallic tin over the previous maximum of 10 per cent. with metallic tin at £300 per ton or over, to 17 per cent. with the price at £1,000 per ton or over. The year's production had, however, realized higher prices than for 1949, and the profit amounted to £41,801.

Expenditure on prospecting of new areas and on labour camps had been written off, and £23,350 had been provided in respect of estimated taxation, and the directors had transferred £3,000 to mining titles reserve, £4,500 to general reserve, and £4,000 to contingencies and investments reserve. From the balance remaining the directors recommended a dividend for the year of 9 per cent., less income tax, and they had also declared an interim dividend for 1951 of 3½ per cent., less income-tax.

The general manager had advised that as one result of prospecting operations during the year (excluding the power drilling of the fluvio volcanic sections), 56 tons were added to tin ore reserves, from which 41 tons only of the year's production had been produced. The reserves estimate at December 31, 1950, was accordingly 590 tons, compared with 575 tons at December 31, 1949. With regard to the fluvio volcanic sections, unexpected difficulties had been encountered in the work preparatory to the opening up of the deep lead deposit located by the power drilling of the previous year, and this work was still proceeding.

In connection with future prospects, the chairman drew attention to the increasing extent that the course of costs was determined by factors outside the control of individual producers, as was evidenced by the material upward revision of the scale of royalties, to which he had alluded.

The report and accounts were adopted.

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